

Scientific Note

**DISTRIBUTIONAL LIMITS OF EUGLOSSINE AND
MELIPONINE BEES (HYMENOPTERA: APIDAE)
IN NORTHWESTERN MEXICO**

Euglossine and meliponine bees are predominantly distributed within the American tropics (Dressler, R.L. 1982. *Ann. Rev. Ecol. Syst.*, 13: 373–384; Roubik, D.W. 1989. *Ecology and Natural History of Tropical Bees*. Cambridge, Univ. Press). Despite the extensive collections of euglossine bees with chemical baits, few extra-tropical records have been reported (Moure, J.S. 1967. *At. Simp. Biota Amazôn.*, 5: 395–415; Kimsey, L.S. & Dressler, R.L. 1986. *Pan-Pacific Entomol.*, 62: 229–236; Kimsey, L.S. 1987. *Syst. Entomol.*, 12: 63–72). Nevertheless, some species occur outside the geographic tropics. In South America there are reports of euglossine and meliponine bees as far south as 32° S (Moure 1967. Wittmann, D., Hoffmann, M. & Scholz, E. 1988. *Entomol. Generalis*, 14: 53–60), but in the Northern Hemisphere it has been thought, until recently, that their distribution was restricted to about 25° N (Roubik 1989), in the Sierra Madre Oriental and central México. During the summers of 1991 and 1993 to 1995 bee collections have been made in several localities in southern Sonora, México (Table 1). These include *Nannotrigona perilampoides* (Cresson), and *Euglossa viridissima* Friese. The former has been collected in wild nests in trunks of *Ipomoea arborescens* (Humb. & Bonpl. ex Willd.) G. Don in the Sierra de Alamos, and from domestic hives kept by Rafael Figueroa at his carpentry in Alamos, Sonora. Male and female specimens of *Eg. viridissima* have been collected visiting flowers of *Tecoma stans* (L.) Juss ex H.B.K. and *Thevetia peruviana* (Pers.) Scum ex Engler & Prantl. However, other plants known to be visited and pollinated almost strictly by euglossine bees are present in the area. These include a large complement of orchids, tropical trees, and vines like *Dalechampia scandens* L. (Armbuster, W.S. & Webster, G.L. 1979. *Biotropica*, 11: 278–283) that are known to be used by euglossine and meliponine bees as food, and also as fragrance and resin sources for attraction and nest building. Males of euglossine bees were also lured with fragrances of eugenol, methyl salicylate, vanillin, and eucalyptol. However, in this study they were only attracted to eugenol.

The area where the bees have been collected is abrupt, with a broken topography dissected by numerous streams, some of them in deeply incised canyons. The vegetation consists of tropical deciduous forest and ecotones to Foothills Thornscrub and Sonoran Desert in the lowlands, and oak woodlands and pine-oak forests on the upper elevations (Gentry, H.S. 1942. *Rio Mayo Plants*. Carnegie Inst. Washington. Publ. 527; Búrquez, A., Martínez-Yrizar, A. & Felger, R.S. 1996. *In: Biodiversity and Conservation in the Sonoran Desert*. Robichaux, R.H. [ed.] Univ. Arizona Press). The capture of specimens of *Eg. viridissima* in southern Sonora, and the occasional reports of other Euglossini in NW Mexico, places the northern Sierra Madre Occidental in the states of Sonora and Chihuahua, as the present absolute northern limit for viable populations of this neotropical group of bees. The repeated collection of male and female individuals of *Eg. viridissima*,

Table 1. Tropical taxa collected near Alamos, Sonora, México or farther north (see Fig. 1). Taxa are ordered by collection date and plant visited. All specimens deposited at the reference collection of Estación Regional Noroeste, Centro de Ecología, UNAM. Elev = elevation in meters. *n* = number of individuals, M = male, F = female. TDF = Tropical deciduous forest.

Taxon Date	Collected on	Locality	Elev	<i>n</i>	Habitat
<i>Euglossa viridissima</i>					
03 Sep 1991	Eugenol bait	Sierra de Alamos (E side)	400	1M	TDF
04 Sep 1991	<i>Thevetia peruviana</i>	Alamos	400	1F	town garden
17 May 1991	Eugenol bait	Sierra de Alamos (E side)	750	6M	TDF
26 Oct 1994	<i>Thevetia peruviana</i>	Alamos	400	1M	town garden
26 Oct 1994	<i>Thevetia peruviana</i>	Yocojihua	350	2M 1F	TDF/thorn- scrub
30 Oct 1995	<i>Tecoma stans</i>	Piedras Verdes	190	1M 2F	town garden
30 Oct 1995	Eugenol bait	Sierra Alamos (N side)	500	1M	TDF
30 Oct 1995	<i>Thevetia peruviana</i>	Yocojihua	350	2M 1F	town garden
30 Oct 1995	Eugenol bait	Sierra de Alamos (E side)	750	2M	TDF
<i>Eulaema polychroma</i>					
04 Sep 1991	<i>Martynia annua</i>	Arroyo Alamos (2 km E)	450	1	TDF
30 Oct 1995	<i>Tecoma stans</i>	Alamos	400	2	town garden
<i>Nannotrigona perilampoides</i>					
30 May 1992	domestic hive	Alamos	400	12	TDF/thorn- scrub
30 May 1992	nest	Sierra de Alamos (E side)	750	60	TDF
30 Oct 1995	nest	Sierra de Alamos (E side)	800	5	TDF
<i>Mesocheira bicolor</i>					
30 Oct 1995	<i>Tecoma stans</i>	Piedras Verdes	190	1	town garden
<i>Mesoplia</i> sp.					
23 Abr 1990	<i>Vitex mollis</i>	Tonichi	250	1	thornscrub
13 Ago 1991	<i>Antigonon leptopus</i>	El Gavilán (E Hermosillo)	325	1	thornscrub
<i>Xylocopa guatemalensis</i>					
17 May 1991	<i>Martynia annua</i>	Sierra de Alamos (E side)	750	1	TDF
<i>Xylocopa muscaria</i>					
17 May 1991	<i>Martynia annua</i>	Sierra de Alamos (E side)	750	1	TDF

the lack of wear on their wings, and the presence of extensive tropical vegetation, along the sierran foothills indicate that these are members of persistent bee populations, rather than long-distance transient vagrants. The collection of *N. perilampoides* at their nests and domestic hives, confirms their presence and use farther north than previously reported (Schwarz, H. F. 1949. An. Inst. Biol. Mex., XX: 357–370). Other bee species found in the region near their extreme northern distribution are: *Partamona bilineata* (Say) [see Rozen, J. 1992. *Melissa*, 5: 1–2], *Eufriesea caerulescens* (Lepelletier) [reported in Kimsey. & Dressler 1986. at Maguarichic, Chihuahua, but close by is Maguarichi, Sonora, both in the Río Fuerte drainage], *Eulaema polychroma* (Mocsáry), *Mesoplia* sp., *Mesocheira bicolor* Fabricius, *Xylocopa muscaria* Fabricius and *X. guatemalensis* Cockerell (this report, Table 1). The occurrence of these strictly tropical bee species, add support to the remarkable deep intrusion of tropical elements along the Pacific

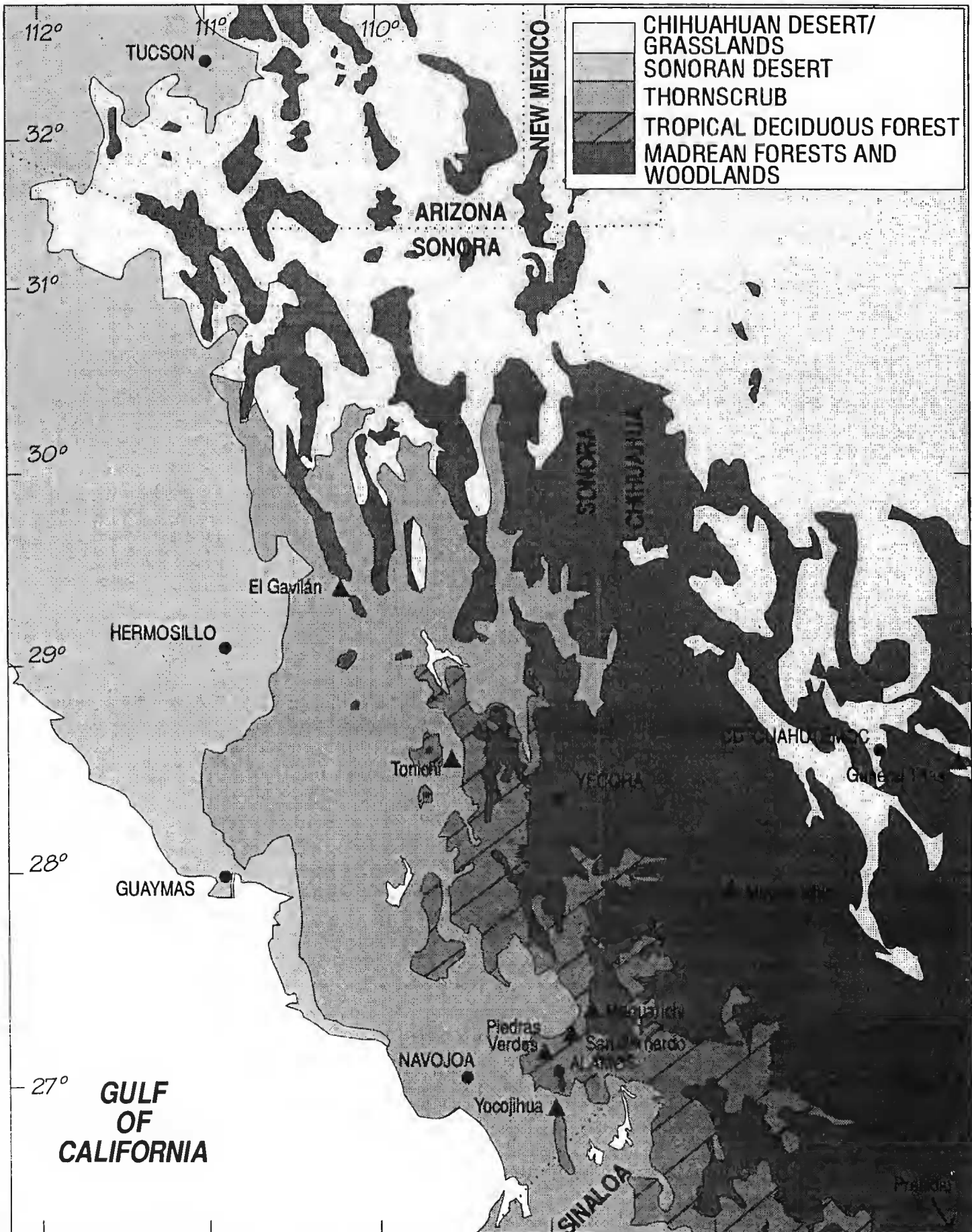


Figure 1. Diagram showing the vegetation of NW México-SW USA. Triangles show the collection sites mentioned in this report.

coast of Mexico far north of the tropic line. This phenomenon is also evident by the numerous strictly tropical plant taxa extending their ranges northwards along the same region (Gentry 1942, P. Jenkins pers. com.).

Euglossine and meliponine bees, as happen with other tropical bees, probably follow the tropical vegetation corridors along the Sierra Madre Oriental and Sierra Madre Occidental. The most northerly tropical communities (tropical deciduous

forest), are present on the western face of the Sierra Madre Occidental (Gentry 1942; Rzedowsky, J. 1978. *Vegetación de México*. Limusa, México). These reach their northernmost occurrence in eastern Sonora, at the Pacific side of the Sierra, developing as an extensive vegetation belt between the Sonoran Desert and the oak Madrean Woodlands, or as isolated patches along the deep sierran canyons (Figure 1; Búrquez et al. 1996). An extreme example of dispersal along the Sierra Madre biological corridors was the recent report of a single male of *E. polychroma* in the Sonoran Desert captured near Tucson, Arizona that probably strayed from populations from the Sierra Madre Occidental (Minckley, R. L. & Reyes, S. G. 1995. *J. Kansas Entomol. Soc.*, 69: 102–104).

Some euglossine bee species, although almost strictly tropical follow these tropical corridors in both hemispheres. Species at their extreme distribution range include *Eufriesea chalybaea* (Friese) that reaches 32° S, near Córdoba, Argentina (Moure 1967), *Ef. violacea* (Blanchard), *Eu. nigrita* Lepageletier, *Eg. cordata* (L.), *Eg. sp. indet.*, and *Ef. sp. indet.*, near Rio Grande do Sul, Brazil (ca. 30° S; Wittmann *et al.* 1988.), while in the Northern Hemisphere, *Ef. mexicana* (Mocsáry) has been collected at Presidio, Durango, México (25° N), and *Ef. caerulescens* (but perhaps the reputed synonym, *Ef. simillima* [Moure & Michener in Moure] D. Yanega pers. com.) has been collected near General Trías, México at 29° N (Rozen 1992, Minckley & Reyes 1995., Kimsey & Dressler 1986). The Sonoran collections of *Eg. viridissima* and *N. perilampoides* (this report) sets the distribution of the genera up to 27° N. However, it is probable that these species extend along the tropical deciduous forests in areas northward up to 29° N. *Eu. polychroma* collected at 32° N (Minckley & Reyes 1995.) is the absolute northernmost range of any euglossine bee, but as Minckley & Reyes (1995) have noted, persistent populations might be farther south, in the Pacific slope of the Sierra Madre Occidental in Southern Sonora, where their reproductive populations may live sympatrically along with other euglossine and meliponine species.

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